

Notice of Allowability

Application No.

09/990,096

Examiner

James A. Thompson

Applicant(s)

GUO ET AL.

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 21 November 2001.
2. ☒ The allowed claim(s) is/are 1-30.
3. ☒ The drawings filed on 21 November 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

EXAMINER'S AMENDMENT

1. The application has been amended as follows:
 - a. On page 11, line 10 of the specification, change "parameter w is not required to adjustable" to "parameter w is not required to be adjustable".
 - b. In claim 1, line 6, change "binarized pixels; said method" to "binarized pixels, said method".
 - c. In claim 1, line 21, change "threshold value, and" to "threshold value; and".
 - d. In claim 11, line 23, change "threshold value, and" to "threshold value; and".
 - e. In claim 21, line 23, change "threshold value, and" to "threshold value; and".
 - f. In claim 22, line 1, change "medium or medium" to "medium or media".
2. Examiner would like to note that Examiner has amended claim 22 as per item 1(f) since "medium or medium" was clearly an unintentional grammatical error and not in any way an attempt by Applicant to provide a further limitation to claim 22.

DETAILED ACTION***Allowable Subject Matter***

2. Claims 1-30 are allowed.

The following is an examiner's statement of reasons for allowance:

Claim 11 recites a computing apparatus for binarizing an image which performs adaptive thresholding in an iterative over every pixel in the image. Within the iteration over each column is nested an iteration over each row. There is a high and low luminance value variable for each column and each row. The threshold value for each pixel is a function of the high and low value of the row in which the pixel is located and the high and low value of the column in which the pixel is located. Or, in mathematical terms: $\{Threshold\} = f(X_{low}(i), X_{high}(i), Y_{low}(j), Y_{high}(j))$, as defined in the specification. While a more limited version of the threshold is given in the specification and in the dependent claims, the above expression defines the threshold as specifically set forth in independent claim 11.

Adaptive thresholding is old and well-known in the art, but this particular methodology of adaptive thresholding is deemed novel. In the prior art, most adaptive thresholding techniques involve local windowing, such as in the patents granted to Park et al. (US Patent 5,268,773) and Kazumasa Koike (US Patent 5,452,107). Some of the more recent prior art, such as the patent granted to Asimopoulos et al. (US Patent 6,195,467 B1), perform adaptive thresholding over the entire image area, but this adaptive thresholding is still performed with respect to a local window that is iteratively stepped throughout the image space. Again, the local, and not the global, conditions play a

Art Unit: 2624

large role in the determination of the threshold value. The patent granted to Richard G. Haltmaier (US Patent 6,498,660 B2) performs adaptive thresholding based on horizontal and vertical pixels, somewhat like the present application, but still performs the adaptive thresholding based on a local windowed set of pixels.

The global adaptive thresholding performed in the present application and specifically recited in claim 11 essentially trains the thresholding computations as the image is processed. Examiner has been unable to find prior art that teaches each and every limitation set forth in claim 11, nor has Examiner found a combination of prior art references which would render claim 11 obvious to one of ordinary skill in the art. Therefore, claim 11 is deemed to patentably distinguish over the prior art. Claims 12-20 are also deemed to patentably distinguish over the prior art at least by virtue of their dependence from claim 11.

Claim 1 recites the limitations of claim 11 in method form, and is therefore also deemed to patentably distinguish over the prior art. Claims 2-10 depend from claim 1 and therefore, for at least this reason, patentably distinguish over the prior art.

Claim 21 recites the limitations of claim 11 in physically embodied computer program product form, and is therefore also deemed to patentably distinguish over the prior art. Claims 22-30 depend from claim 21 and therefore, for at least this reason, patentably distinguish over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James A. Thompson
Examiner
Art Unit 2624

JAT
05 May 2005



THOMAS D.
~~THOMAS~~ LEE
PRIMARY EXAMINER